Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC- SEMESTER–III - EXAMINATION – SUMMER 2017

Subject Code: X30603 **Date:31/05/2017**

Subject Name: Structural Analysis - II

Time: 02:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** A three-hinged Parabolic arch is having a span of 40 m and rise of 8.0 m. The arch is subjected to a Point load of 40 kN at a distance of 10 m from the left hand. Calculate the location and magnitude of the maximum bending moment in the arch. Draw the Bending Moment diagram also. **07**

(b) A three- hinged semi-circular arch of uniform cross-section having a span of 30 m and a rise of 15 m, is subjected to a Point load of 40kN at a distance of 8.0 from the left hand. Calculate the location and magnitude of the maximum bending moment in the arch **07**

Q.2 **(a)** Write down the various assumptions made in the theory of Slope deflection. Also explain the various steps for analyzing beams using SD method. **07**

(b) Define Absolute Stiffness, Relative Stiffness. Also state the advantages of the Moment Distribution method over the Slope Deflection Method. **07**

OR

(b) Derive the Basic equation of the Slope deflection method. **07**

Q.3 Determine the reactions and draw the shear force diagram (SFD) and bending moment diagram (BMD)for the continuous beam as shown in the **Figure.1**: **14**

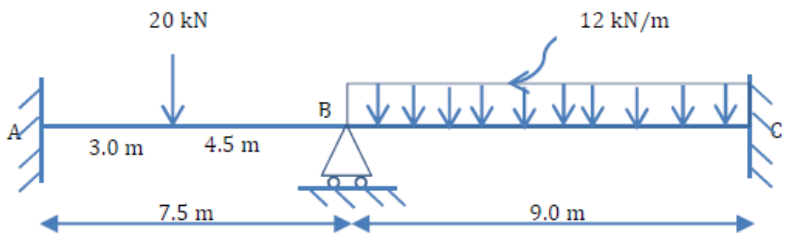

Fig. 1

OR

Q.3 Analyse the Beam as shown in **Figure.1** using Stiffness Method and draw the SFD and BMD. **14**

Q.4 **(a)** A spherical dome of 100 mm thickness, base diameter of 14m and central rise of 3.5 m, supports total uniformly distributed load of 4.0kN/m^2 over the surface inclusive of self -weight. Determine the Meridional and Hoop stresses at the ring beam level. **07**

(b) A hollow Cast iron column whose outside diameter is 200 mm has a thickness of 20 mm. It is 4.5 m long and is fixed at both the ends. Calculate the load bearing capacity using Rankine's formula. Take fc=550 N/mm^2 , Rankine's constant = 1/1600. **07**

OR

Q.4 **(a)** State the difference between Stiffness Method and Flexibility Method. **07**

(b) Analyse the Beam as shown in **Figure 2,** using the Flexibility Method. Draw the SFD and BMD for the same. **07**

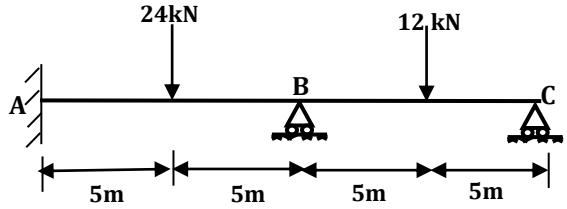

Fig. 2

Q.5 **(a)** Construct the Influence line for the beam as shown in **Figure 3**. For the following: (a) Reaction at A (b) Reaction at B (c) Shear at Point C. **14**

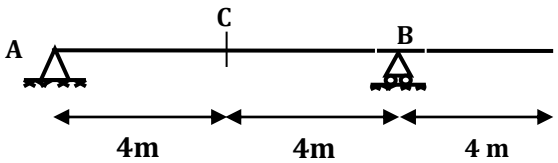

Fig. 3

OR

Q.5 **(a)** Define the following terms: **14**

(1) Cable (2) Stiffness (3) Flexibility (4) Distribution Factor (5) Carry over factor (6) Influence line Diagram (7) Muller Breslau's Principle.

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